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(56) Documents Cited  
GB 2286944 A GB 1447981 A GB 1365945 A  
GB 1360501 A GB 1349665 A GB 1196854 A  
WO 92/05660 A1 WO 87/01892 A1 WO 87/01891 A1

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## (54) Television receiver with printer

(57) A television set is provided with a picture freeze circuit 32 and a luminance level measuring circuit 34 which are activated by a signal output from a print command circuit 36. The picture freeze circuit 32 then stores the RGB signal representing the picture on the screen at the time of the activation signal from the print command circuit 36. The picture freeze circuit 32 is connected to an LCD driver 42 and an LCD colour panel 44 for displaying the stored picture. Light passing through the LCD panel is focused onto a film (figure 3, 60) for reproduction of the displayed image.

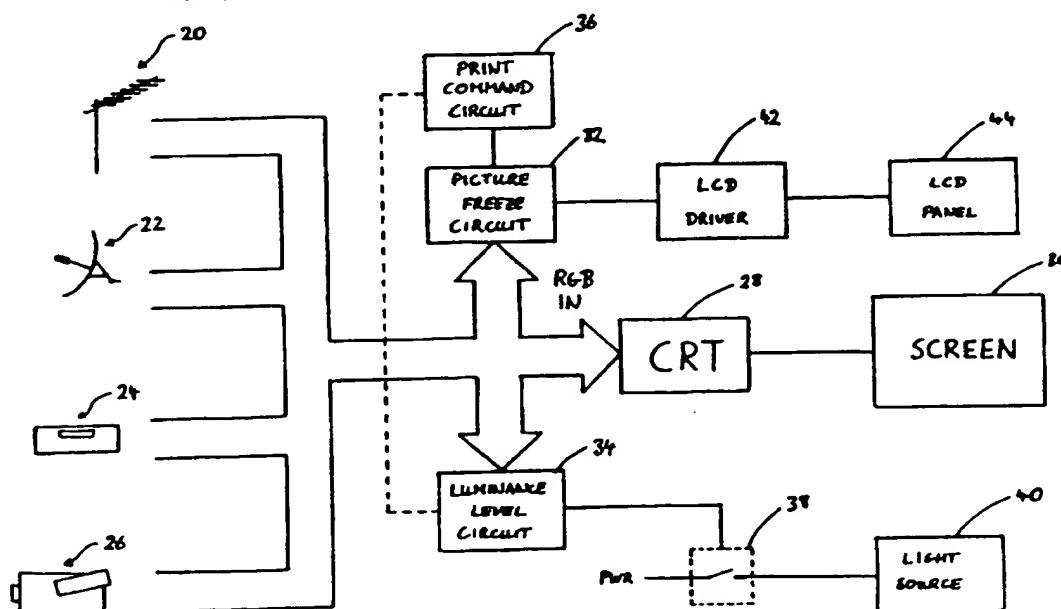


Figure 2

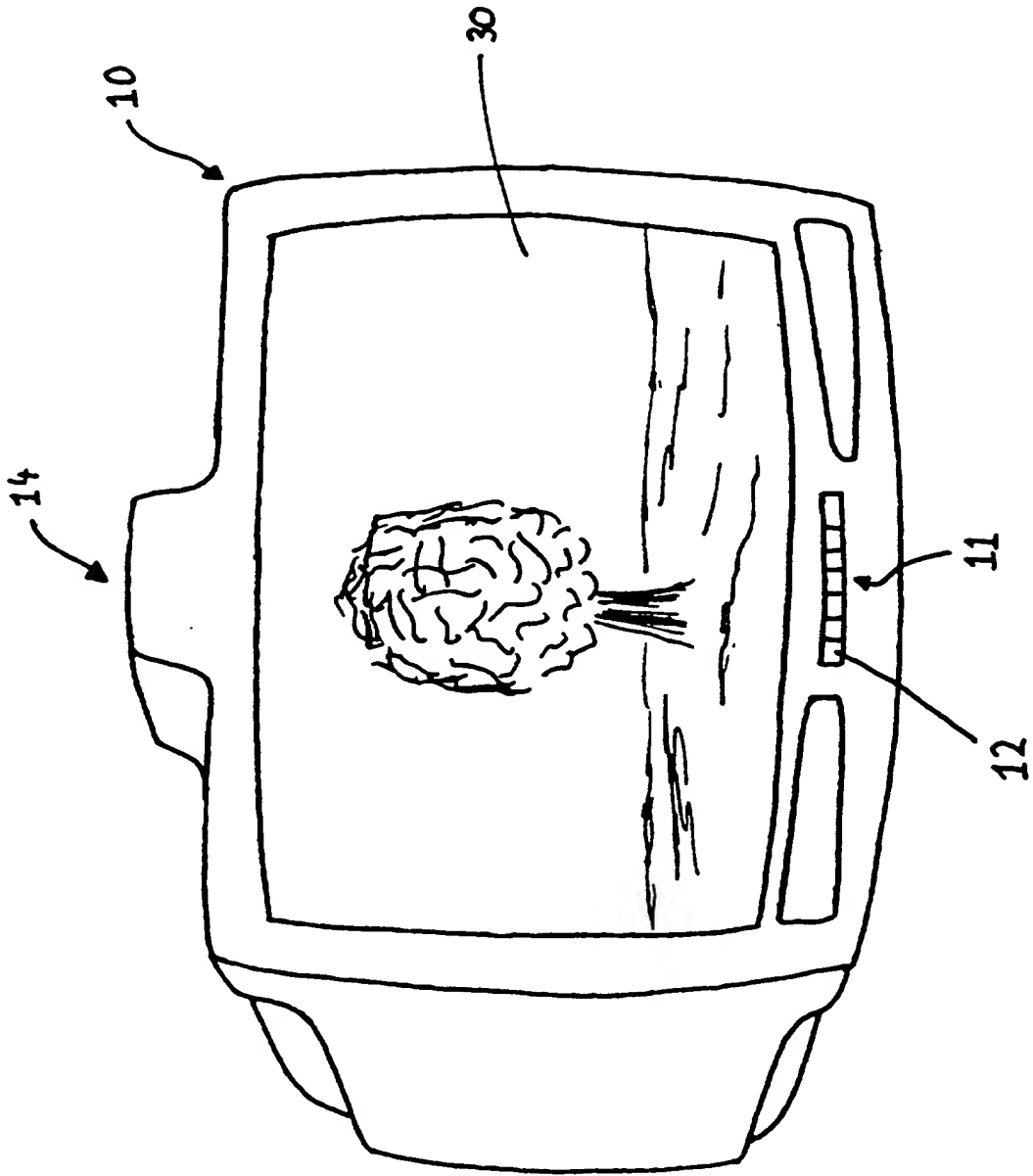


Figure 1

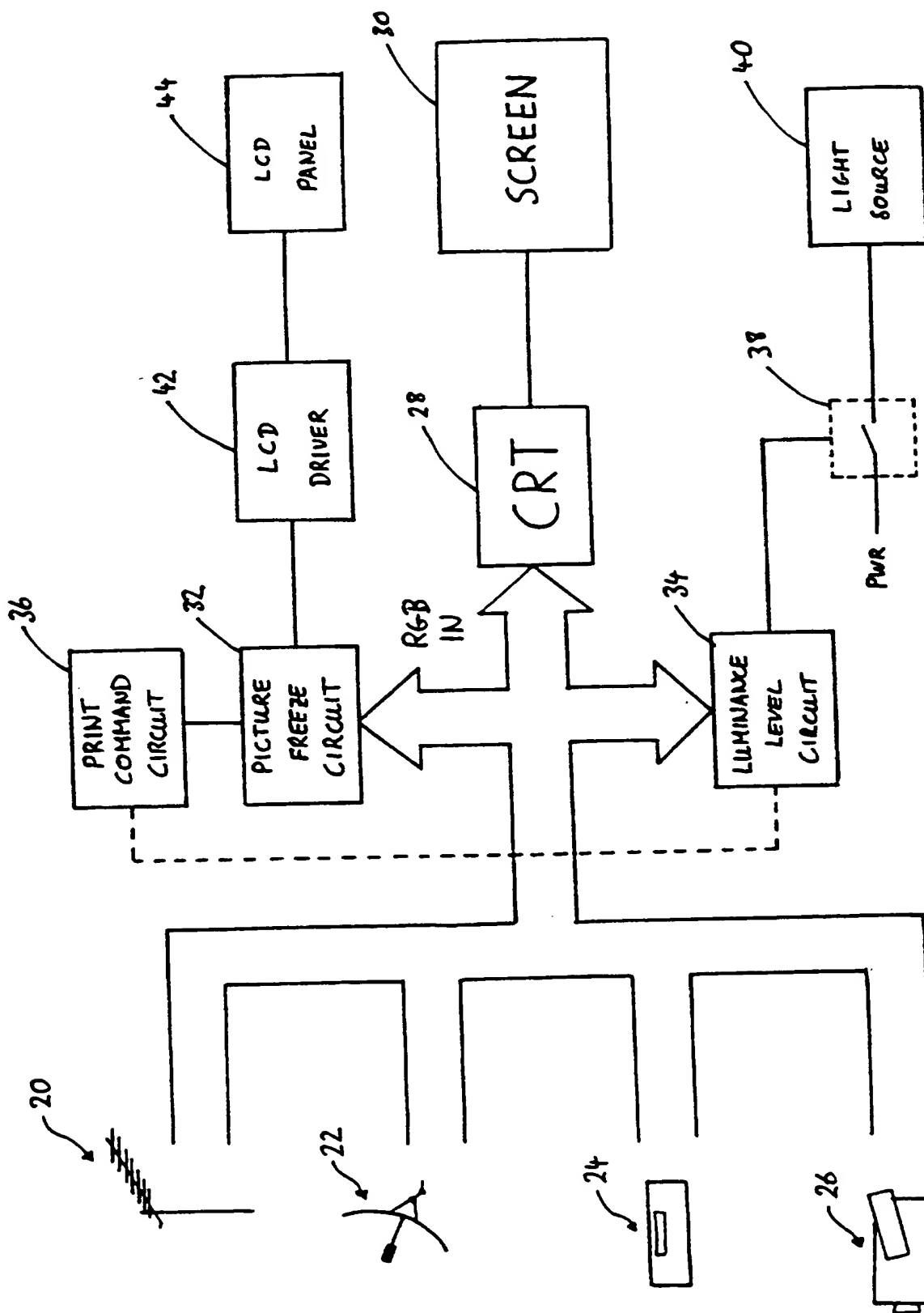
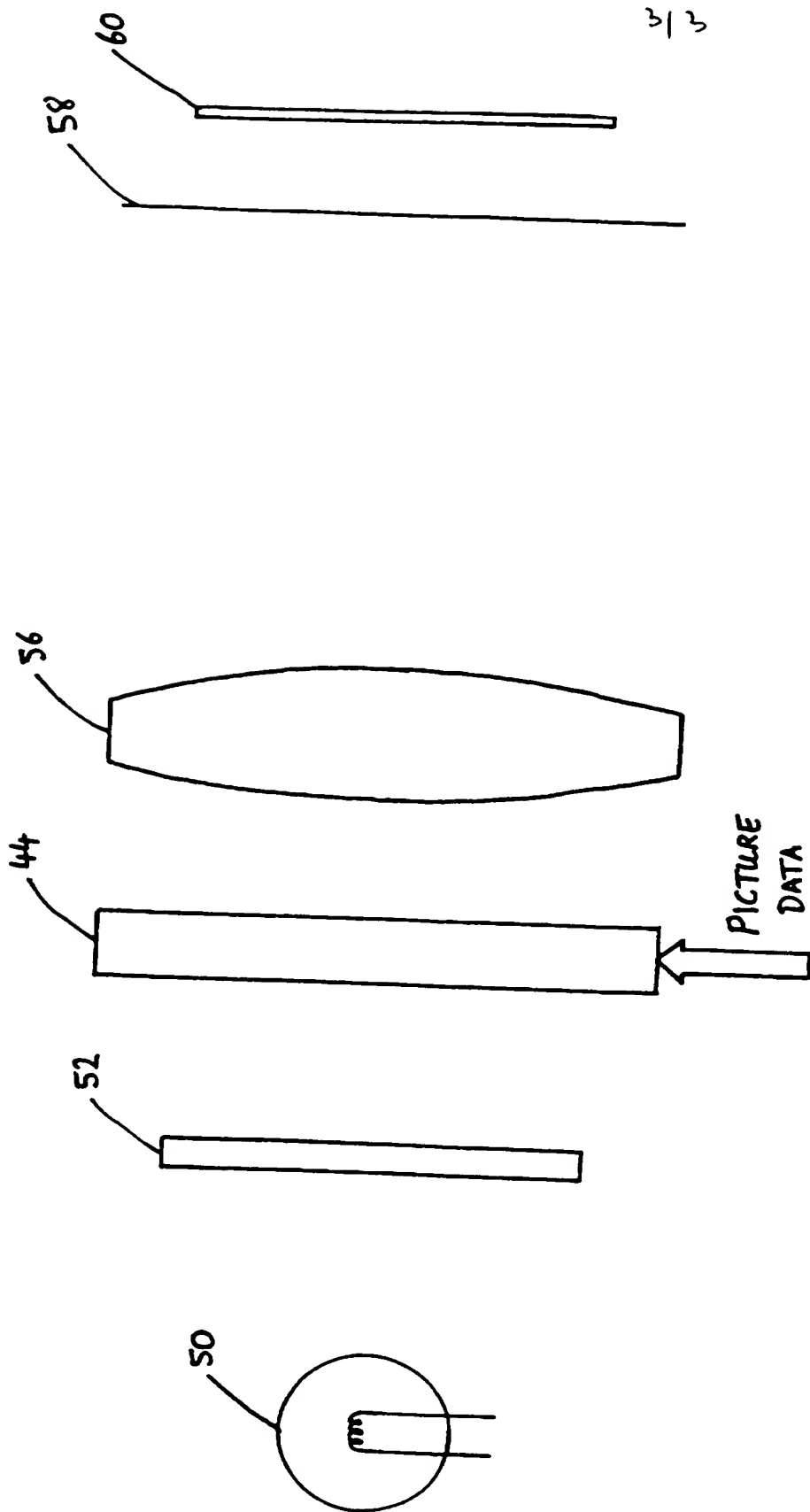


Figure 2

Figure 3



TELEVISION RECEIVER

The present invention relates to a television set.  
5 In particular, it relates to a television set which can provide a print or negative of any picture displayed on the screen of the set.

Owing to the increasing use of photographic and  
10 video cameras it is estimated that several billion images are now recorded annually. Although all of these images are intended to be appreciated by the human eye, an increasing proportion of these images are being stored in a non-visible form. For example, the images stored  
15 by video cameras are stored on a magnetic tape and some recently introduced photographic cameras store pictures in an electronic memory, rather than on a photographic film.

20 In order to convert these images into a visible form in which they can be appreciated by the human eye, it is necessary to connect the camera or video camera to a television set which operates a compatible signal encoding protocol and is provided with a compatible  
25 terminal. In many situations, the need for such a television is burdensome. In addition, even if such a

television set is available, the images shown on the television are of a transient nature. It is therefore desirable to be able to produce a print of the image so that it can be more easily appreciated by others.

5

Some systems for producing a print of a picture stored on such a camera or video camera are already available. For example, a combination of a personal computer, a monitor, a video recorder and a thermal  
10 printer may be used to produce a print of an image stored on a video. A video typically consists of several thousand images, only a few of which will best capture a particular moment. A particular advantage of systems for producing a print of a picture recorded on video is  
15 that they allow the printing of images which were captured at exactly the right moment in time.

However, up until now, few of these systems are being used. This is primarily owing to the fact that  
20 such systems are both expensive and bulky.

It is therefore an object of the present invention to produce a relatively cheap and compact apparatus for providing a print or negative of an image which may be  
25 displayed on a television screen.

According to the present invention there is provided  
a television set comprising:

one or more picture data receiving terminals;  
a screen;

5 means for displaying the picture represented by said  
data on said screen;

a print command means; and

means for providing a print or negative of said  
picture;

10 the arrangement being such that when a picture  
desired to be printed is displayed on said screen, said  
print command means is operated, whereupon said picture  
is recorded in said print or negative.

15 Such a system provides the advantage that an image  
stored in a non-visible form can easily be converted into  
a visible form in which it can be immediately appreciated  
without the need for expensive or bulky apparatus.

20 Preferably, said print or negative providing means  
comprises;

an illumination source; and

second means for displaying said picture;

the arrangement being such that, in use, at the time  
25 that a picture desired to be printed is displayed on said  
screen, said print command means is operated, whereupon

said picture is displayed on said second display means, the light from said illumination source projecting said picture displayed on said second display means onto a film, whereby the picture desired to be printed is  
5 recorded on said film.

This arrangement has the advantage that the expense and bulkiness of a thermal printer is avoided.

10 Advantageously, said television set further comprises:

means for measuring the luminance component of said picture data;

means for controlling the duration of the  
15 illumination provided by said illumination source responsive to the measurement of the luminance component; whereby the brightness of the print faithfully reproduces the luminance of said picture.

20 Preferably, said photographic film retaining means is arranged to retain an instant photographic film in use.

This has the advantage that there is no requirement  
25 to develop the photographic film before obtaining a print.



There now follows a detailed description, given by way of example only, of a specific embodiment of the present invention. This description is given with  
5 reference to the accompanying drawings in which:

Figure 1 is a schematic illustration of a television set with a print producing capability;

Figure 2 is a block diagram showing the different components of the television set and the flow of signals  
10 therebetween;

Figure 3 is a schematic illustration of the optical system incorporated within the television set.

Figure 1 shows a television set (10) which is  
15 arranged to provide a Polaroid (Registered Trade Mark) print of the picture present at the time a print command button (12) is pressed. The print command may also be initiated by use of a remote control.

20 The television set is substantially identical to a conventional television and is therefore provided with a control panel (11) and a screen (30). However, the television (10) additionally has a hood portion (14) on its upper surface. The hood portion (14) is integrally  
25 moulded as part of the housing of the television (10) and extends rearwardly from a forward face flush with the

front of the television. The forward face of the hood portion (14) is substantially rectangular being 15cm in length and 9 cm in height. The cross-section of the hood portion (14) is maintained as it extends at a slight downward angle through a distance of about 10cm towards the rear of the television.

The hood portion (14) is provided at its forward end on its upper surface with a socket (not shown) for receiving a Polaroid (Registered Trade Mark) film cartridge. A mechanism for ejecting an exposed Polaroid (Registered Trade Mark) film is associated with the cartridge and serves to propel the exposed film in an upward direction so that it may be taken from the upper surface of the television by the user.

Figure 2 shows the components of the television set associated with the print facility and the flow of signals between those components. The TV set is provided with a number of inputs which accept picture data from conventional television aerials (20), satellite dishes (26), video cassette recorders (24), camcorders (26) and photographic cameras (not shown). The signals from these devices are then processed in a conventional manner to provide an RGB signal. The RGB signal has four different signal components, namely red, green, blue and luminance

components. The signal is applied to the cathode ray tube (28) of the television so as to form a picture on the screen (30) of the television.

5           In addition to these conventional components, the television (10) is further provided with a picture freeze circuit (32) and a luminance level measuring circuit (34). Both of these circuits are activated by a signal output from a print command circuit (36). The print  
10   command circuit (36) is arranged to output a signal at the time the print button (12) is pressed or at the time a print command is received from the remote control unit. The picture freeze circuit (32) then stores the RGB signal representing the picture on the screen at the time  
15   of the activation signal from the print command circuit (36). The picture freeze circuit (32) is connected to an LCD driver (42) and an LCD colour panel (44) such that the LCD colour panel (44) displays the picture which is stored in the picture freeze circuit.

20

          On receipt of the activation signal from the print command circuit the luminance level measuring circuit (34) provides a single pulse output, the duration of which is proportional to the level of the luminance  
25   signal in the picture which is desired to be printed. The pulse output by the luminance level circuit (34) is

passed to a relay (38) which causes power to be applied to a light source (40) for the duration of the pulse.

Figure 3 shows the optical system which is incorporated inside the hood (14) of the television set (10). The principal axis of the optical system is arranged to lie along the central forward/rearward axis of the hood portion (14).

The rearmost component of the optical system is a 5W incandescent light source (50). The light from this light source travels forwardly to a magenta filter (52) which ensures that the light which is passed therethrough has a similar frequency spectrum to that of daylight. Immediately forward of the magenta filter (52) is the LCD colour panel (44). This panel (44) has the shape of a square lamina whose sides are approximately 20mm in length. It will be remembered that the LCD panel (44) displays the colour picture stored by the picture freeze circuit (32). Light passed forwardly through the filter and the LCD panel (44) then impinges on a lens (56) which focuses the image formed by the light passing through the LCD panel (44) onto a film (60) stored in the Polaroid (Registered Trade Mark) film cartridge. The focal length of the lens is 29mm and is provided with an aperture stop such that its F number is 2. A shutter (58) is provided

to prevent light falling upon the film when the print facility is not in operation.

It has been found that these light source and lens characteristics provide an optimal Polaroid (Registered Trade Mark) image of the picture desired to be printed. In particular, greater powers of illumination can result in the temperature around the bulb (50) becoming too high and greater lens apertures can result in the amount of astigmatism increasing and the depth of field of the image decreasing.

In operation, at the time that a picture desired to be printed is shown on the screen (30), the user of the system presses the print button (12) whereupon both the picture freeze circuit (32) and the luminance level measuring circuit (34) begin their operation. The picture freeze circuit (32) captures and stores the RGB signal describing the picture and provides this stored picture data to the LCD driver (42) and LCD panel (44). As a result, the LCD panel displays a colour image of the picture which was displayed on the television screen (30) at the time the print button (12) was pressed.

The luminance level circuit (34) then measures the luminance level of the picture which was displayed on the

television screen (30) at the time the print button (12) was pressed. Once this measurement has been carried out, the shutter (58) is opened and the luminance level circuit (34) outputs a pulse whose duration is

5 proportional to the luminance level of the picture desired to be printed. Power is then applied to the light source (50) during the duration of that pulse, which is typically around 1 second. Light from the light source is then filtered by the magenta filter (52) to

10 provide light of a similar spectrum to daylight, the filtered light then passing through the colour LCD panel (44) and being focused by the lens (56) to form an image of the picture displayed on the LCD panel (44) on the Polaroid (Registered Trade Mark) film (60). Soon after

15 the pulse produced by the luminance level circuit (34) is finished, the shutter (58) is closed and the ejection mechanism ejects the exposed Polaroid (Registered Trade Mark) film (60) upwardly from the hood portion (14) of the television set (10) so that the print can be

20 collected by the user.

**CLAIMS:**

1. A television set comprising:
  - one or more picture data receiving terminals;
  - 5 a screen;
  - means for displaying the picture represented by said data on said screen;
  - a print command means; and
  - means for providing a print or negative of said
  - 10 picture;
  - the arrangement being such that when a picture desired to be printed is displayed on said screen, said print command means is operated, whereupon said picture is recorded in said print or negative.
  - 15
2. A television set according to claim 1, wherein said print or negative providing means comprises:
  - an illumination source; and
  - second means for displaying said picture;
  - 20 the arrangement being such that, in use, at the time that a picture desired to be printed is displayed on said screen, said print command means is operated, whereupon said picture is displayed on said second display means, the light from said illumination source projecting said
  - 25 picture displayed on said second display means onto a film, whereby the picture desired to be printed is

recorded on said film.

3. A television set according to claim 2, further comprising:

5 means for measuring the luminance component of said picture data;

means for controlling the duration of the illumination provided by said illumination source responsive to the measurement of the luminance component;

10 whereby the brightness of the print faithfully reproduces the luminance of said picture.

4. A television set according to any preceding claim, including a photographic film retaining means.

15

5. A television set according to claim 4, wherein said photographic film retaining means is arranged to retain an instant photographic film in use.





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Claims searched: All

Examiner: Joe McCann  
Date of search: 11 November 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): H4F(FAAG,FDX,FCP,FCQ);G2A(AALA)

Int CI (Ed.6): H04N(1/21,1/23,1/50,5/76,5/775);G03B(27/00,27/30)

Other: Online: WPI,JAPIO

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2286944A (EASTMAN KODAK) - see abstract	1-3
X	GB 1447981 (GROOVE CONSULTING) - see abstract	1-3
X	GB 1365945 (MATSUSHITA) - see abstract	1-3
X	GB 1360501 (MATSUSHITA) - see figure 3	1-3
X	GB 1349665 (MATSUSHITA) - see figure 1	1-3
X	GB 1196854 (HONEYWELL INC) - see abstract	1-3
X	WO 92/05660 (EASTMAN KODAK) - see abstract and figure	1-3
X	WO 87/01892 (EASTMAN KODAK) - see abstract	1-3
X	WO 87/01891 (EASTMAN KODAK) - see abstract	1-3

X Document indicating lack of novelty or inventive step  
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